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# FURTHER CONTRIBUTION TO THE KNOWLEDGE OF *SPARGANIUM* FROM THE DECCAN INTERTRAPPEAN BEDS OF PATAN, CHANDRAPUR DISTRICT (M.S.), INDIA

Wanjari M. H., Jain A. A.

Department of Botany, Om Satyasai College, Parsodi (Bhandara), India \*Corresponding author: mangeshwanjari998@gmail.com

#### ABSTRACT

*Sparganium* is the sole genus of family Sparganiaceae which is variously allied to Pandanaceae, Typhaceae and Xanthorrheaceae and represented by numerous impressions and petrifications of various plant parts. The paper represents the petrified multilocular fruit specimens. The specimens under study were obtained from the well-known but unexplored locality of Patan; a small village of Jivati tehsil in Chandrapur district of Maharashtra state. The locality is a treasure of plant fossils but still unexplored due to its location in remote area, discovered by Dahegaonkar. Five different fruit specimens are described in this paper; from which four specimens are obtained from the same chert while fifth one from another chert; but in various angles.

Keywords: Sparganium, Petrified, Chert.

#### 1. INTRODUCTION

The Sparganium grows well near Muddy or shallow water at margins of ponds, lakes, streams; in ditches and swamps [1]. Sparganium erectum is an emersed aquatic herb nearly 1.5 m tall and widespread aquatic plant, it can form dense colonies near hindering waterflow. [2,3]. The inflorescence in Sparganium is unisexual and consists of a sessile capitulum. The drupes are born radially around a central, subglobose head on the upper part of stems and branches [2, 4]. Many researchers describe variously the parts of the fruits; the present paper gives elaborate information of the petrified fruit.

#### 2. MATERIAL AND METHODS

The specimen have been search out from black silicified cherts, exposed in the field of locality Patan. After breaking and eatching with Hydrofluoric acid, they appeared as diamond shaped and obpyramidal structures showing two to four chambers. Part and counterpart was available and are well preserved. After making peels were mounted on DPX. Serial peel sections are photographed for further study.

#### **3. DESCRIPTION**

Five specimens are described in this paper; from which four specimens are obtained from the same large chert and all are cut in their obliquely transverse plane. These four specimens are cut from various positions of the fruit from basal region to the apical region and containing two to four chambers. The middle position of the fruit shows Tetralocular condition while apical and basal region shows only Bilocular structure.

Fifth specimen is cut in its obliquely longitudinal plane, showing clear cut four chambers. The two locules of the fruit are mature from the apical region having edospermic seeds. The fruit had dome shape with persistent bracts at the apical region [2]. While the basal two locules are not much ripened and have parenchymatous mass of cells. Lower part pyramidal to narrowly obconical, sometimes ridged, usually with 3-4 persistent tepals attached at base [5].

#### Specimen 1

Cut from the Middle of the fruit in obliquely transverse plane showing four chambers which gradually changes into three chambers as peeling continued. It is 1.6 mm broad and 1.05 mm wide. (Plate1 figs.1 And Plate 2 fig. 1 to 5)

#### Specimen 2

Cut from the Middle to basal region of the fruit in oblique transverse plane and hence shows two large chambers while other two chambers are appearing as peeling continued. It is 1.5 mm broad and 1.1 mm wide. (Plate 1 figs. 2 And Plate 3 Figs. 1 to 3).

#### Specimen 3

Cut from the basal region of the fruit in t.s. and hence shows only two chambers. It is 1.4 mm broad and 8.05 mm wide from wider region of the fruit. The specimen appears hooded from six edges of the fruit. (Plate 1 figs. 3 And Plate 3 figs. 4 to 6).

# Specimen 4:-

Cut from Middle to apical region of the fruit in Oblique t.s. Showing two large chambers and two small chambers which are remains of the basal chambers. It is 1.75 mm broad and 1.2 mm wide from the wider region of the fruit. (Plate 1 figs. 4 And Plate 6 to 10).

# Specimen 5

This specimen is cut in oblique longitudinal plane from middle of the fruit. It shows four chambers having two maturing apical chambers while two basal chambers. The fruit is stalked and persistent calyx are appearing towards the base of the fruit originated from the stalk, it is 1.05 mm in length. The fruit is 2.7mm in length and 1.05 mm broad from the broadest region of the fruit. (Plate figs. 1 - 5).

All above specimens have well preserved seeds which are irregular in outline with well preserved endosperm.

#### 3.1. General Description

The nature of the fruit is drupaceous and formed of bicarpellate ovary as in species like *S. eurycarpum, S. borderei, S. polyedrum* etc. The bicarpellate nature of the drupes is very clearly brought out by the transverse section of a fossil fruit. The shape of the fruit is obpyramidal. Lower part is pyramidal to narrowly obconical, sometimes ridged having persistant tepals attached at the base. The fruits are indehiscent.

#### 3.1.1. Fruit wall (Pericarp)

Anatomically the fruit is well preserved and fruit wall is very thick, multilayred and differanciated into epicarp, a clearly defined mesocarp and endocarp. The pericarp is irregular in outline and thickness of the wall layers.

Epicarp is single layered and 0.2 mm in thickness and made up of oval to polygonal cells. The mesocarp spongy, aerolated, Sclerenchymatous and consist of columnar cells and 0.3 mm to 0.8 mm in thickness from various regions of pericarp and is the broadest zone of the fruit. The endocarp is stony measuring 0.2 mm in thickness is the innermost layer and made up of few layered cells which are oval to elongated in shape. Few cavities present on pericarp may be secretory glands which is the distinctive feature of all parts of *sparganium*.

#### 3.1.2. Septae

The three chambers of the fruit are separated by three distinct septae, which are the inward extensions of

pericarp layers from the adjacent chambers. The chambers dehisce from the middle of the fruit wall.

# 3.1.3. Seed

A single irregular shaped seed is present in each locule of the fruit. The seeds are cut in oblique planes hence, the specific shape of the seed is not confirmed. Seeds adherent to the endocarp.

#### 4. DISCUSSION AND IDENTIFICATION

After comparing the present specimens with the live fruits of the genus *Sparganium* of family Sparganiaceae, it is found that they have similarity in characteristics of the fruits such as structure of the fruit, attachment of the fruit, type of fruit, structure of the pericarp, Presence of bract etc. The bicarpellate nature of the drupes is clearly brought out by the transverse section of the fossil fruits. As the specimens are collected from the Patan locality, the specimen was given the *Sparganium patanii* sp. nov. name for convenience.

#### Sparganium patanii sp. nov.

The fruits are Pyramidal to Obconical in shape, appearing as two to four chambered fruits in transverse planes, Presence of persistent bracts. The fruit wall is well differentiated into outer epicarp 0.2 mm, middle sclerenchymatous and aerolated mesocarp 0.3 mm to 0.8 mm thick and inner stony endocarp 0.2 mm thick, presence of glands. Seeds endospermic.

#### 5. CONCLUSION

From the Patan locality other plant groups suchas pteridophytes representing Sellaginella and marsilea remains are also collected which are the marshy inhabitants. Also the presence of Spaganium showing spongy and aerolated pericarp from this locality may confirms the marshy habitat of this locality.

Holotype :- MHW/Fr. 4 Specimens 1to 5/Deposited at Botany Dept. J. M. Patel College, Bhandara.

Horizon :- Deccan Intertrappean Beds of Maharashtra state,

Locality :- Patan, Chandrapur district (M.S.)

Age :- Uppermost Cretaceous.

# *Sparganium patanii* sp. nov. Explanation of Plate 1 figs. 1 to 6

- 1. To 4. Specimens as seen exposed in Transverse planes on Chert.
- 5. Specimen as seen exposed in Longitudinal plane on chert.
- 6. Specimen as seen in live state in Various planes.



# *Sparganium patanii* sp. nov. Explanation of Plate 2 figs. 1 to 10

- to 4. Specimen 1 showing transition from 3 chambered into 4 chambers and as peeling continued again converted into 3 chambered.
  - 5. Pericarp of the fruit showing upper epicarp, middle aerolated mesocarp and inner thin endocarp.
- to 9. Specimen 4 showing from 2chamberd to 3 chambered and then into 4 chambered.
  - 10. Pericarp of the fruit showing upper epicarp, middle stony mesocarp and inner thin endocarp.

Specimen no. - 1



# Sparganium patanii sp. nov.

# Explanation of Plate 3 figs. 1 to 10

- 1. Specimen 2 as exposed in oblique t.s. on chert in part.
- 2. Specimen 2 as exposed in oblique t.s. on chert in counterpart.
- 3. Single chamber enlarged showing differentiation of pericarp into epicrp, mesocarp and endocarp, and also cellular detail.
- 4. Specimen 3 as exposed in oblique t.s. on chert.
- 5. and 6. Cellular detail inside the chamber.
- 7. Specimen 5 as exposed in l.s. on chert showing stalk and persistent calyx.
- 8. Cellular details of the stalk and pericarp from basal region.
- 9. Detailed structure of persistent bracts towards apical region.
- 10. Details of the pericarp showing outer epicarp, middle sony and aerolated merocarp and inner endocarp.

Specimen no. - 2



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